U.S. Department of Transportation
Federal Aviation Administration

Subject:	INFORMATION: Certification Options for Class E Cargo Compartments on Aircraft having a Volume of 800 ft³ or less	Date:	June 8, 2000
From:	Manager, Transport Standards Staff, ANM-110 Aircraft Certification Service	Reply to Attn. of:	00-113-1014
To:	SEE DISTRIBUTION LIST		

The purpose of this memorandum is to clearly identify the options available to an applicant attempting to certify a Class E cargo compartment in small transport category aircraft where the total volume of the flight crew and original passenger compartment(s) (i.e. total pressure vessel volume) is 800 ft³ or less. Per §25.831(f) passenger aircraft of this size have not been required to design separate temperature and ventilation control systems for the flight crew compartment.

With respect to Class E Cargo Compartments, section 25.857(e)(4) requires that *"There are means to exclude hazardous quantities of smoke, flames, or noxious gases, from the flight crew compartment."* There is no evidence that the regulatory promulgators envisioned that this standard should be interpreted as a "no smoke" requirement. The "no smoke" criteria described in Advisory Circular (AC) 25-9A is an acceptable means of compliance though it appears to be a more stringent method than the regulation requires. Sections 25.831 and 25.857 (e) impose requirements predicated on “a hazardous quantity” of smoke. This allowance can be traced back to CAM 4b, as effective during the 1953 version. The key point is that the part 25 standards do not preclude the presence of some smoke provided that it is “nonhazardous.”

The following options have been identified for complying with the provisions of § 25.857(e)(4):

a. Use of methods existing in Advisory Circular 25-9A as a means of compliance - This Advisory Circular identifies one means of compliance that the FAA has found to be acceptable. Due to the difficulty of assessing the toxicity of products of combustion, the AC 25-9A guidance states that no smoke from the Class E compartment can enter and remain in the cockpit. If no smoke enters the cockpit it is concluded that the design has “excluded hazardous quantities of smoke flames, or noxious gases” and therefore complies with the rule.

b. Propose an Acceptable Means of Compliance with 14 CFR 25.857(e)(4) -An applicant may propose a means of compliance to the rule in lieu of the method provided in AC 25-9A. This means of compliance would first be outlined in a Certification Plan for the project in question. Due to the nature and complexity of this issue an “Acceptable Means of Compliance” issue paper would then follow the applicant’s initial proposal. The use of an issue paper will provide a formal means by which the applicant, the Aircraft Certification Office, and the Transport Directorate can communicate and record their positions in writing. The issue paper provides a vehicle for the FAA to approve or disapprove of a proposed means of compliance. It is in the applicant’s best interest to pursue and obtain the FAA’s agreement with a means of compliance early in the project.

c. Equivalent Safety Findings -If compliance with a rule can not be shown due to some circumstance, §21.21(b)(1) allows the FAA the discretion to make a finding that the non-compliance is "compensated for by factors that provide an equivalent level of safety" if it is warranted. The applicant must request an Equivalent Safety Finding and submit along with the request all the necessary data required for the FAA to develop an Equivalent Safety Finding issue paper and make a finding of equivalent safety. The data must identify: the applicable regulation to which the equivalent safety finding will be shown, describe the feature(s) of the design that require a finding of compliance, describe any design changes, limitations, equipment, etc. necessary to establish equivalency (i.e. factors), and provide an explanation of how the actions taken provide an equivalent level of safety to that intended by the regulation. Equivalent Safety Finding determinations are made by the Transport Airplane Directorate (TAD) via issue papers and are not subject to publication in the Federal Register for public comment.

d. Petition for Exemption to the Rule -Section 11.25 allows any applicant the opportunity to petition the FAA for an exemption to a regulation(s). As outlined in the regulations, the petition must contain all the arguments supporting the action sought (e.g. kinds of operation, service history, etc.), why the granting of the request would be in the general public interest, and why the exemption would not adversely affect safety. The grant of an exemption does not require the level of safety to be equivalent to that established by the regulation. Exemptions can specify additional criteria and/or conditions that must be met. Exemptions to the transport category rules are processed and dispositioned by the TAD. Petitions for exemption are subject to publication in the Federal Register and public comment and as provided in 11.25(b)(1) "*…unless good cause is shown in that petition, be submitted at least 120 days before the proposed effective date of the petition*."

The following are the key technical issues that the Directorate has identified to date. At a minimum any proposal should address these issues:

1. Toxicity Hazard of Combustion Products -The TAD considers a hazardous quantity of smoke as that concentration which would incapacitate any crewmember, disable any passenger, or create long term health problems in passengers or crew. AC 25-9A acknowledges that the products of combustion depend on the fuel consumed, the environment (oxygen availability), the rate of combustion and numerous other factors which may make it impractical to provide a complete prediction of all possible contaminants.

2. Visual Hazard of Combustion Products –In addition to resolving the smoke toxicity issue, there should be a means to assure the quantity of smoke in the cockpit does not become a visual hazard to continued safe flight and landing.

The TAD is committed to working with applicants to establish certification methods that are practical and meet the intent of the safety objectives of the applicable airworthiness standards. In order for this process to work effectively, the applicant must submit a design for review and evaluation by the FAA. A certification plan which outlines the proposed method for complying with the provisions of 25.857(e) should also be submitted.

If you wish to discuss this matter further, you may contact Mr. Ross Landes, ANM-113, at 425-227-1071.

Original signed by Lirio Liu Nelson for

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